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43. ~~The system of Claim 9, wherein the computer system determines a filter strength, wherein the filter strength identifies a particular filter from a plurality of filter choices each having different filter characteristics.~~

44. The system of Claim 9, wherein the computer system determines a filter strength, wherein the filter strength identifies a particular filter from a plurality of filter choices each having different filter characteristics.

32 45. The video presentation of Claim 17, wherein the computer system includes a display.

34 46. The system of Claim 23, wherein the system includes a display.

47. The system of Claim 23, wherein the system determines a filter strength, wherein the filter strength identifies a particular filter from a plurality of filter choices each having different filter characteristics.

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48. ~~The system of Claim 23, wherein the system determines a filter strength, wherein the filter strength identifies a particular filter from a plurality of filter choices each having different filter characteristics.~~

49. The method of Claim 24, wherein the computer system includes a display.

50. The method of Claim 24, additionally comprising determining a filter strength, wherein the filter strength identifies the amount of smoothing performed by a filter.

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51. ~~The method of Claim 24, additionally comprising determining a filter strength, wherein the filter strength identifies a particular filter from a plurality of filter choices each having different filter characteristics.~~

52. The system of Claim 32, wherein the computer system includes a display.

5 53. The method of Claim 38, wherein the first frame is received in a computer system includes a display.

65 54. The system of Claim 38, wherein the system includes a display.

REMARKS

In response to the Office Action, Applicant respectfully requests the Examiner to reconsider the above-captioned application in view of the foregoing amendments and the following comments.

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The specific changes to the amended claims are shown on a separate set of pages hereto and entitled VERSION WITH MARKINGS TO SHOW CHANGES MADE, which follows the signature page of this Amendment. On this set of pages the insertions are underlined while the deletions are stricken through.

Discussion of Objections to the Claims

In the Office Action, the Examiner objected to Claims 5, 6, 13, 14, 21, 22, 28, 29, 33, and 34, stating that: "the term 'proximately positioned pixels' lacks antecedent basis because there is no reference in claims 4, 12, 20, 27, or 32, respectively, that defines this term."

Applicant respectfully submits that Claims 5 and 6, in addition to being dependent on Claim 4, are also dependent on Claim 3, which provides proper antecedent basis for the term "proximately positioned pixels." Applicant notes that Claims 13 and 14 do not depend on Claim 12, but instead, depend on Claim 11 which provides proper antecedent basis for the term "proximately positioned pixels". Applicant also notes that Claims 21 and 22 do not depend on Claim 20, but instead, depend on Claim 19 which provides proper antecedent basis for the term "proximately positioned pixels". Furthermore, Applicant notes that Claims 28 and 29 do not depend on Claim 27, but instead, depend on Claim 26 which provides proper antecedent basis for the term "proximately positioned pixels". Lastly, Applicant notes that there is antecedent basis for the term "proximately positioned pixels" in Claim 32, which is a base claim for Claims 33 and 34. In summary, Applicant respectfully submits that there is proper antecedent basis for the term "proximately positioned pixels" in the objected to claims and requests withdrawal of these objections.

Discussion of Claim Rejections Under 35 U.S.C. § 103(a)

Applicant has the following comments to the Examiner's rejections under 35 U.S.C. § 103(a)

Claims 1, 9, 17, 23, 24, and 37

In the Office Action, the Examiner rejected Claims 1, 2, 9, 10, 17, 18, 23-25, and 37 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,568,200, to Pearlstein, et

al. (hereinafter "Pearlstein) in view of U.S. Patent No. 6,181,382 to Kieu, et al. (hereinafter "Kieu").

Independent Claims 1, 9, 17, and 24 are generally directed to methods of generating an intermediate frame from other frames and filtering the at least a portion of the generated third data by reducing visible discontinuity between adjacent elements in the generated third frame. Independent Claims 23 and 37 are generally directed to systems for outputting an intermediate frame between a first and second frames and filtering the intermediate frame by reducing the visible discontinuity between adjacent elements.

Pearlstein is generally directed to a system for encoding and decoding data in accordance with MPEG standards. Col. 6, lines 47-52 of Pearlstein states: "[f]or example, the first row of macroblocks may be intra-coded in the first frame, and the second row of macroblocks may be intra-coded in the second frame. In this manner, a complete reference frame can be created after a certain number of frames are encoded."

In the Office Action, the Examiner acknowledged that Pearlstein fails to filter a generated frame by reducing visible discontinuity between adjacent elements in the generated third data but took the position that these elements are described by Kieu. Kieu describes a system for converting a standard interlaced video signal having 55.94 fields per second into an HDTV video signal having 60.00 fields per second. Kieu accomplishes the conversion by removing one out of one every thousand of frames and interpolating two intermediate frames. *See* Kieu, col. 2, lines 53-67 and col. 3, line 64- col. 4, lines 13. According to Kieu, the "proposed 'deleting one-inserting two' technique reduces substantially the motion discontinuity." *See* Kieu, col. 2, lines 62-64.

Applicant respectfully submits that there is no motivation or suggestion to combine the teachings of Pearlstein with Kieu. Prior art can be modified or combined to reject claims as *prima facie* obvious, only as long as there is a reasonable expectation of success. *See* M.P.E.P. § 2143.02. Applicant respectfully submits that the combination of Pearlstein with Kieu would not have a reasonable expectation of success. Since Pearlstein is directed to improvements to encoding and decoding data, and not directed to converting signals from one rate into another, combination with Kieu would provide strange and undesired effects. Deleting one frame and

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inserting two frames every thousand of frames in Pearlstein, absent a need to convert the frame rate, would undesirably provide a different frame rate than what is expected.

Also, Applicant respectfully submits that the Examiner has failed to provide sufficient motivation to combine the references. The purpose of Kieu is eliminate the problems identified in certain systems that perform up conversion, such as those that merely repeat a field or those that apply spatio-temporal filters. *See* Kieu, col. 1, lines 41-65. In contrast, Pearlstein is directed to improvements in encoding and decoding data. In the Office Action, the Examiner stated that such a modification would enable reduced motion discontinuity in Pearlstein. Applicant respectfully submits that since Pearlstein is not directed to an HDTV up converter, Pearlstein would not have the motion discontinuity that is associated with these systems.

Moreover, Applicant respectfully submits that even if Pearlstein was modified by Kieu, such combination would not teach or suggest Applicant's claimed invention. Applicant respectfully submits that Kieu does not teach or suggest filtering the interpolated video frame as stated by the Examiner. Kieu deletes one frame and adds two frames which has the effect of reducing motion discontinuity. Applicant's claimed method is directed to filtering a portion of the *generated* frame. Applicant's claimed *filtering*, and not *frame rate interpolation*, has the effect of reducing the visible discontinuity between adjacent elements. Applicant respectfully submits that Kieu wholly fails to teach or suggest filtering so as to reduce visible discontinuity between adjacent *elements*. Kieu teaches frame rate interpolation so as to reduce visible discontinuity between successive *frames*.

Since neither Pearlstein or Kieu teach or suggest filtering the generated frame, Applicant respectfully submits that these claims are in condition for allowance. Applicant notes that although these are some of the differences in the claims, there are other differences that have not yet been discussed.

Claim 32

Independent Claim 32 was rejected under 35 U.S.C. § 103(a) as being obvious over Pearlstein, Kieu, U.S. Patent No. 5,974,144 to Krtolica (hereinafter "Krtolica") and Baxes, Digital Image Processing: Principles and Applications (hereinafter "Baxes").

Claim 32, as amended recites: "determining a filter strength, wherein the filter strength identifies the number of pixels from the edge of the macroblock quadrants; [and] selectively filtering pixels in the macroblock quadrants based upon the filter strength." After interpolation of a frame based upon one or more base frames, blocks that were adjacent in the base frame may no longer be adjacent in the interpolated frame. Although upon frame interpolation, a block from the base frame may serve as a good substitute for the interpolated block, the pixels at the edges of each interpolated block may not be a perfect match with the pixels at the edge of a neighboring block. Accordingly, in one embodiment, a filter process is employed to the pixels near the edges of the macroblocks.

In the Office Action, the Examiner acknowledged that neither Pearlstein nor Kieu disclose determining a filter strength and selectively filtering pixels in each of the macroblock based upon the filter strength. However, the Examiner took the position that such features are described in Krtolica.

Krtolica is generally directed to a system for distributing record data using transmittal symbols hand entered on a transmittal sheet. *See* Krtolica, abstract. The particular symbols on the transmittal sheet are used to identify the recipient of certain scanned documents. *See* col. 4, lines 63-64 and Fig. 5. Once a transmittal sheet is scanned, the Krtolica system searches for the hand entered transmittal symbols in the scanned image. To facilitate this, Krtolica describes that the scanned images can be filtered so as to identify "connected" pixels of a certain size that correspond to the hand entered transmittal symbols. For example, small instructional text or border lines can be filtered from the image.

Applicant respectfully submits that Krtolica in isolation or in combination with the other cited references does not teach or suggest "determining a filter strength, wherein the filter strength identifies the number of pixels from the edge of a macroblock that are to be filtered; [and] selectively filtering pixels in the macroblock quadrants based upon the filter strength." The Krtolica system does not partition a scanned image macroblock quadrants. Furthermore, Krtolica does not identify a number of pixels from the edge of the macroblock quadrants.

Moreover, Applicant respectfully submits that such features are not taught or suggested by Baxes. Baxes merely describes certain filtering techniques, e.g., low-pass spatial filters and

high-pass spatial features. Baxes fails to teach or suggest filtering selected pixels near the edge of the macroblock.

Furthermore, Applicant respectfully submits that Krtolica is directed to non-analogous art and that there is no motivation for one of ordinary skill in the art to combine Krtolica with the other cited references. To establish a prima facie case of obviousness, there must be some motivation or suggestion in either: the nature of the problem to be solved; the teachings of the prior art; or the knowledge of persons of ordinary skill in the art. *See* M.P.E.P. § 2143.01. Also, Applicant respectfully submits that to rely upon a reference, it must be analogous art. *See* M.P.E.P. § 2141.01(a).

Krtolica is directed to processing scanned images and determining the content of the scanned images. Applicant respectfully submits that optical character recognition is directed to a technology that is different than that relates to processing encoded and decoded images.

Applicant also respectfully submits that there is no teaching or suggestion that the filtering process of Krtolica is used to affect the character of graphic that displayed to the user. According to Krtolica, the scanned information is used by the computer to distribute certain scanned content. In contrast, Pearlstein, Kieu, and Baxes are each directed to processing data for eventual display to a user. Applicant respectfully submits that the examiner has failed to provide a sufficient motivation for combining Krtolica with the other cited references. In the Office Action, the Examiner stated that "such motivation would add to the Pearlstein-Kieu-Baxes system the capability to distinguish image from text." However, there is no suggested need in Pearlstein, Kieu, and Baxes to distinguish image from text.

For the foregoing reasons, since the cited references do not teach or suggest in isolation or in combination at least the above-limitations, Applicant respectfully submits that this claim is in condition for immediate allowance.

Claim 36

Independent Claim 36 was rejected under 35 U.S.C. § 103(a) as being obvious over Poynton, A Technical Introduction to Digital Video (hereinafter "Poynton") in view of Kieu. In the Office Action, the Examiner acknowledged that Poynton does not disclose filtering the second frame to reduce visible filtering. The Examiner took the position that such features were

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described by Kieu. Applicant respectfully traverses this for the reasons discussed above with respect to independent Claim 1, and respectfully submits that Claim 36 is in condition for allowance.

Claims 2-8, 10-16, 18-22, 25-31, 33-35

Since Claims 2-8, 10-16, 18-22, 25-31, and 33-35 each depend on one of Claims 1, 9, 17, 24, and 32, Applicant respectfully submits that these claims are allowable for the reasons previously discussed.

Summary

Applicant has endeavored to address all of the Examiner's concerns as expressed in the outstanding Office Action. Accordingly, amendments to the claims for patentability purposes, the reasons therefore, and arguments in support of the patentability of the pending claim set are presented above. Any claim amendments which are not specifically discussed in the above remarks are not made for patentability purposes, and the claims would satisfy the statutory requirements for patentability without the entry of such amendments. In addition, such amendments do not narrow the scope of the claims. Rather, these amendments have only been made to increase claim readability, to improve grammar, and to reduce the time and effort required of those in the art to clearly understand the scope of the claim language. In light of the above amendments and remarks, reconsideration and withdrawal of the outstanding rejections is specifically requested. If the Examiner has any questions which may be answered by telephone, he is invited to call the undersigned directly.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: Aug. 23, 2002

By: E. M. Nelson

Eric M. Nelson
Registration No. 43,829
Attorney of Record
2040 Main Street, 14th Floor
Irvine, CA 92614
(619) 235-8550

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Please amend Claims 1, 7, 9, 15, 17, 30, and 32 as follows:

1. (Amended) In a computer system having a memory , a method of generating video frames comprising:

receiving in the memory first data representing a first video frame, the first data comprising a plurality of elements ~~in a memory in the computer system, each element~~ relating to a group of pixels;

receiving in the memory second data representing a second video frame, the second data comprising a plurality of elements relating to a group of pixels;

generating third data representing at least one video frame based upon information from the first and/or second data, the third data comprising a plurality of elements having visible discontinuity between adjacent elements in the memory in the computer system;

storing the third data in the memory; and

filtering at least a portion of the generated third data by reducing visible discontinuity between adjacent elements in the generated third data.

7. (Amended) The method of Claim 2, further comprising ~~the steps of:~~

determining a filter strength, wherein the filter strength identifies the number of pixels from the edge of the macroblock quadrants; and

selectively filtering pixels in each of the macroblock quadrants based upon the filter strength.

9. (Amended) A system for generating video frames, the system comprising:

means for receiving first video frame data in a memory in ~~a~~ the computer system, the first video frame data comprising a plurality of elements, each element corresponding to a group of pixels, the first video frame data representing a first video frame;

means for receiving second video frame data in the memory in the computer system, the second video frame data comprising a plurality of elements, each element corresponding to a group of pixels, the second video frame data representing a second video frame;

means for generating at least one intermediate video frame based upon information from the first video frame data and/or the second video frame data, the third video frame data

comprising a plurality of elements, the at least one intermediate video frame representing at least one selected element at a position intermediate to respective positions whereat the element is represented by the first video frame and the second video frame; and

filter means for reducing visible discontinuity between at least two adjacent elements in the at least one generated intermediate video frame.

15. (Amended) The system of Claim 10, further comprising:

means for determining a filter strength for the filtering act, wherein the filter strength identifies the number of pixels from the edge of the macroblock quadrants; and

means for selectively filtering pixels in the macroblock quadrants based upon the filter strength.

17. (Amended) A video presentation, comprising:

first frame data in a memory in ~~a~~ the computer system, the first frame data representing a first video frame, the first frame data comprising a plurality of elements, each element corresponding to a group of pixels;

second frame data in the memory in the computer system, the second frame data representing a second video frame, the second frame data comprising a plurality of elements, each element corresponding to a group of pixels; and

intermediate frame data representing an intermediate video frame between the first and second video frames, the intermediate frame data based upon information from the first and second frame data, the second frame data comprising a plurality of elements, the intermediate video frame representing at least one selected element at a position intermediate to respective positions whereat the selected element is represented by the first video frame and the second video frame, and wherein at least a portion of the intermediate video frame has been filtered to reduce visible discontinuities between elements.

24. A program storage device, storing instructions which, when executed, perform the steps method comprising:

receiving first data representing a first video frame, the first data comprising a plurality of elements in a memory in the computer system, each element relating to a group of pixels, the first data representing a first element at a first position in the first video frame;

receiving second data representing a second video frame, the second data comprising a plurality of elements in the memory in the computer system, each element relating to a group of pixels, the second data representing the first element at a second position in the second video frame;

generating third data representing an intermediate video frame based upon information from the first and/or second data, the third data representing the first element at a position intermediate to the first and second positions; and

filtering at least a portion of the intermediate video frame by reducing visible discontinuity between the first element and an adjoining element.

30. (Amended) The program storage device of Claim 25, additionally comprising instructions that when executed perform ~~the steps~~:

determining a filter strength, wherein the filter strength identifies the number of pixels from the edge of the macroblock quadrants; and

selectively filtering pixels in the macroblock quadrants based upon the filter strength.

32. (Amended) In a computer system, a method of generating frames, the method comprising ~~the acts of~~:

receiving a first frame in a memory in the computer system, the first frame representative of a digital image at a first time, the first frame including a plurality of macroblocks, each of the macroblocks having four quadrants with a plurality of rows and columns of pixels, and each of the pixels having an associated intensity value;

receiving a second frame in the memory in the computer system, the second frame representative of the digital image at a second time, the second frame including a plurality of macroblocks, each of the macroblocks having four quadrants with a plurality of rows and columns of pixels, and each of the pixels having an associated intensity value;

generating at least one intermediate frame based upon the macroblock quadrants in the first and/or second frames, the at least one intermediate frame representative of an intermediate position of one or more selected macroblock quadrants in the first frame and/or the second frame;

determining a filter strength, wherein the filter strength identifies the number of pixels from the edge of the macroblock quadrants;

selectively filtering pixels in the macroblock quadrants based upon the filter strength;

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determining the average of the pixel intensity of one or more proximately positioned pixels with respect to each of the selected pixels; and

associating with each selected pixel the respective determined average pixel intensity.

36. (Amended) A system for generating video frames, the system comprising:

a frame analysis module for receiving frames; and

a frame synthesis module for generating at least one frame between two received frames, the frame synthesis module filtering the generated frames thereby reducing visible discontinuities in at least region in the generated frame including adjoining elements that includes visible discontinuities.

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